User's Manual

for

16-Port 10/100Mbps-TX
Auto-MDI/MDIX Ethernet Switch

(Revision 1.0)

(SEP. 2002)

FCC Class A Appliance

This equipment generates and uses radio frequency energy. If it is not installed and used properly in strict accordance with the manufacturer's instructions, it may cause interference to radio and television reception. It has been type-tested and found to comply the specifications in sub-part J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. There is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
Re-orient the receiving antenna

- Relocate the computing device with respect to the receiver
- Move the computer away from the deceiver
- Plug the computer into a different outlet so that compute and receiver are on different electrical circuits.

If necessary the user should consult the dealer or an experienced radio or television technician for additional suggestions.

The information in this manual is subject to change without notice. All the brand names are registered trademarks of their respective companies.

Checklist

Check the contents of your package for following parts: 16 port 10/100Mbps Nway Switch

- User's manual
- AC power cord
- Rack mount bracket set (for 19" model only)

If any of these pieces are missing or damaged, please contact your dealer immediately, if possible, retain the carton including the original packing material, and use them against to repack the product in case there is a need to return it to us for repair.

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Introduction

The 16 port 10/100Mbps Switch is designed to allow simultaneous transmission of multiple packets via an internal high-speed data channel. This means that it can partition a network more efficiently than bridges or routers in most environments. This 16 port Switch is a highly reliable network switch and is the ideal device for bridging Ethernet to Fast Ethernet workgroups or networks. Simple and cost-effective, the 16 port Switch supports IEEE802.3u, IEEE802.3, 100Base-TX, and 10Base-T. The 16 port Switch is therefore fast being recognized as one of the most important building blocks for today networking technology.

Compact in size and designed for Plug and Play installation, the 16 port Switch allows the network administrator to simply connect the network and power cables and the switching/bridging functions begin automatically. No hardware or software configurations are required.

The front panel of the 16 port Switch provides LEDs for easy recognition of the switch operation status and for troubleshooting. These LEDs display the power status for the system and link, speed, collision, full duplex, and receive status for each port.

With Ethernet Switch designed specifically for connecting workgroup devices and desktops, companies no longer have to invest in expensive and inflexible switches engineered primarily for backbone implementations. Instead, companies can deploy scaleable, affordable switches that increase the aggregate bandwidth of the network by boosting throughput to the workgroups that need it most.

Features and Specifications

Features:

- 16 port 10/100Mbps TX Auto-MDI/MDIX Ethernet Switch
- Complies with the IEEE802.3 Ethernet and IEEE802.3u Fast Ethernet standard
- Features Store-and-Forward mode with wire-speed filtering and forwarding rates
- Support up to 8K MAC address
- Support up to 512Kbyte(4Mbit) on-chip packet buffers
- Full/Half-Duplex capability on every TX ports
- Automatic source address learning and aging
- IEEE802.3x compliant full duplex flow control , half-duplex control
- Broadcast storm control, runt and CRC Filtering eliminates erroneous Packets to optimize the network bandwidth
- Support to handle up to1536 bytes packet
- Internal power supply
- Auto MDI/MDI-X on all TX port
- Plug and Play

Specifications:

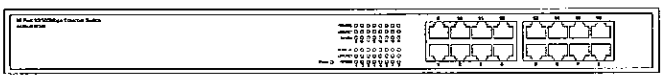
- Standard: IEEE802.3/ IEEE802.3u
- Network Media:
  100Base-TX - UTP/STP category 5 cable
  10Base-T - UTP/STP category 3 or 5 cable
- Connector: STP RJ-45 port for 10/100Mbps
- LED indicators:
  System - Power LED
  Individual port – Link/activity, Speed, and Full Duplex/ Collision LEDs
- Dimension:
  Rack-mount- 432mm(L) x 200mm(W) x 44mm(H)
  SOHO-220mm(L) x131mm(W) x 44mm(H)
- Temperature: Operating - -20℃ - 50℃,
  Storage - -30℃ - 70℃
- Humidity: Operating - 5%-95%RH, Storage - 5% - 90%RH
- Input Power Requirement: 100 ~ 240VAC, 50/60Hz, Auto-sensing
- Registrations: FCC Part 15 Class A, CE Class A

Hardware Description

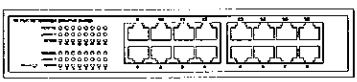
This section describes the hardware features of the 16-port 10/100Mbps Smart Switch. For easier management and control of the switch, familiarize yourself with its display indicators, and ports. Front panel illustrations in this chapter display the unit LED indicators. Before connecting any network device to the hub, read this chapter carefully.

Front Panel

The unit front panel provides a simple interface monitoring the switching hub. It includes a power indicator for each port.



19" width model



9" width model

16port switch front panel

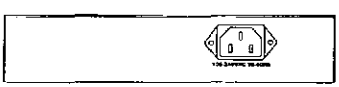
LED indicators

LED Function	Color	Description
PWR	Green	Lit: System Power on
LINK/ACT	Green: 100Mbps	Steadily Lit: Indicates the connection between hub and adapter is good
SPEED	Green	Steadily Lit: 100Mpbs Off: 10Mbps
FDX/COL	Yellow	Steadily Lit: Full Duplex Blinking Lit: Collision

Rear Panel

The rear panel of the 16-port 10/100Mbps Smart Switch indicates a AC-jack power socket, which accepts input power from 100 to 240VAC, 50/60Hz.

19" width model



9" width model

16 port switch rear panel

Hardware Installation

- Place the Ethernet Switch on a smooth surface
- Connect the AC power cord to the AC inlet socket of 16-port Switch
- Connect hub or PC to one port of the Ethernet Switch using Category 3/4/5 UTP/STP cabling.
- Connect another hub or PC to the other port of Ethernet Switch by following the same process as described in Step3.

Notice:

Cable distance for Ethernet Switch

The cable distance between Ethernet Switch and hub/PC should not exceed 100 meter.

Make sure the wiring is correct

It can be used Category 3/4/5 cable in 10 Mbps operation. To reliably operate your network at 100Mbps, you must use an Unshielded Twisted-Pair (UTP) Category 5 cable, or better Data Grade cabling. While a Category 3 or 4 cable may initially seem to work, it will soon cause data loss.

All kinds of hub/PC can connect to 16 port switch by using straight-through wires. The 16 port 10/100Mbps Switch provides one additional RJ-45 connector converted from port No. 8 for "Uplink" function. The default setting of push-bottom switch is at normal position.

Switch Operation

Address Table

The 16 port 10/100Mbps Switch is implemented with an address table. This address table composed of many entries. Each entry is used to store the address information of some node in network, including MAC address, port no, etc. This information comes from the learning process of Ethernet Switching.

Learning

When one packet comes in from any port. The 16 port 10/100Mbps Switch will record the source address, port no. and the other related information in address table. This information will be used to decide either forwarding or filtering for future packets.

Forwarding & Filtering

When one packet comes from some port of the Ethernet Switching, it will also check the destination address besides the source address learning. The Ethernet Switching will lookup the address-table for the destination address. If not found, this packet will be forwarded to all the other ports except the port which this packet comes in. And these ports will transmit this packet to the network it connected. If found, and the destination address is located at different port from this packet comes in, the Ethernet Switching will forward this packet to the port where this destination address is located according to the information from address table. But, if the destination address is located at the same port with this packet comes in, when this packet will be filtered. Thereby increasing the network throughput and availability

Store-and-Forward

Store-and-Forward is one type of packet-forwarding techniques. A Store-and Forward Ethernet Switching stores the incoming frame in an internal buffer, do the complete error checking before transmission. Therefore, no error packets occurrence, it is the best choice when a network needs efficiency and stability.

The Ethernet Switch scans the destination address from the packet-header, searches the routing table provided for the incoming port and forwards the packet, only if required. The fast forwarding makes the switch attractive for connecting servers directly to the network, thereby increasing throughput and availability. However, the switch is most commonly used to segment existing hubs, which nearly always improves overall performance. An Ethernet Switch can be easily configured in any Ethernet network environment to significantly boost bandwidth using conventional cabling and adapters.

Due to the learning function of the Ethernet switch, the source address and corresponding port number of each incoming and outgoing packet are stored in a routing table. This information is subsequently used to filter packets whose destination address is on the same segment as the source address. This confines network traffic to its respective domain, reducing the overall load on the network.

The 16-port Ethernet Switch performs "Store and forward" therefore, no error packets occur. More reliably, it reduces the re-transmission rate. No packet loss will occur.

Auto-Negotiation

The STP ports on the switch have built-in "Auto-negotiation". This technology automatically sets the best possible bandwidth when a connection is established with another network device (usually at Power On or Reset). This is done by detect the modes and speeds at the second of both device is connected and capable of, Both 10Base-T and 100Base-TX devices can connect with the port in either Half- or Full-Duplex mode.

If attached device is :	The port will set to:
10Mbps, no auto-negotiation	10Mbps
10Mbps, auto-negotiation	20Mbps(10Base,Full Duplex)
100Mbps, no auto-negotiation	100Mbps
100Mbps, auto-negotiation	200Mbps(100Base,Full Duplex)

Troubleshooting

This chapter contains information to help you solve problems. If the 16-port Ethernet Switch is not functioning properly, make sure the 16-port Ethernet Switch was set up according to instructions in this manual.

The Link LED is not lit
Solution:
a. Make sure the switch configuration is consistent with the connecting device
b. Check the cable connections.

Performance is bad
Solution:
a. Check the full duplex status of the Ethernet Switching. If the Ethernet Switching is set to full duplex and the partner is set to half duplex, then the performance will be poor.

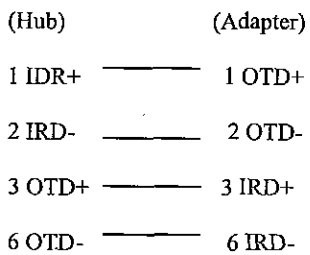
Some stations can not talk to other stations located on the other port
Solution:
The address table may contain older information than of the address table of that node. Please power down to refresh the address information.

Hub's RJ-45 Pin Assignments

Pin	Station Ports 1-8	Uplink Port
1	Input Receive Data +	Output Transmit Data+
2	Input Receive Data -	Output Transmit Data-
3	Output Transmit Data+	Input Receive Data +
6	Output Transmit Data-	Input Receive Data -
4,5,7,8	Not used	Not used

Schematics for both straight and crossover twisted-pair cable are shown below. (Note that crossover cable is only required if you cascade hubs via the RJ-45 station ports; i.e. the Uplink port is not used.)

Straight-Through



Crossover